

Headquarters U.S. Air Force

Integrity - Service - Excellence

Modeling & Simulation ***An Air Staff Perspective***



U.S. AIR FORCE

**Colonel John
Lanicci
HQ USAF/XOWX**



U.S. AIR FORCE

Overview

- **Historical Perspective**
- **Current Status**
- **Way Ahead**



U.S. AIR FORCE

THE ROADMAP-- BASIS FOR STRATEGY

Concept Paper:

“Integrating Weather Exploitation into Air & Space Power Doctrine Using Modeling & Simulation”

Foundation for the strategy--What we need to do & why

- Endorsed by XO in Nov 96, submitted to APJ in Feb 97
- **The “Why”:** Issues that will make air & space power more weather-sensitive
 1. Shrinking Force Structure and CONUS-Based Forces
 2. Increasing Reliance on PGMs
 3. Increasing Reliance on Space-Based Assets
 4. Evolving Rules of Engagement
 5. Military Operations Other Than War

As of:

I n t e g r i t y - S e r v i c e - E x c e l l e n c e



U.S. AIR FORCE

THE ROADMAP-- BASIS FOR STRATEGY

The “What”: Paper’s recommendations form basis for our strategy

1. Test & evaluate AF systems in as many types of adverse

environmental conditions as possible

- Define the “operating envelope” of friendly systems and “exploitable envelope” vis-a-vis analogous enemy systems

2. Emphasize analysis of the effects on military operations of

weather phenomena and weather forecast accuracy

- Joint venture between Environmental and Ops Research communities

3. DoD Weather Services must identify, analyze, and predict

those regimes exploitable by Air and Space power

Integrity of Service Excellence

As of: ▫ Implies shift in R&D emphasis from Storm of the Century /

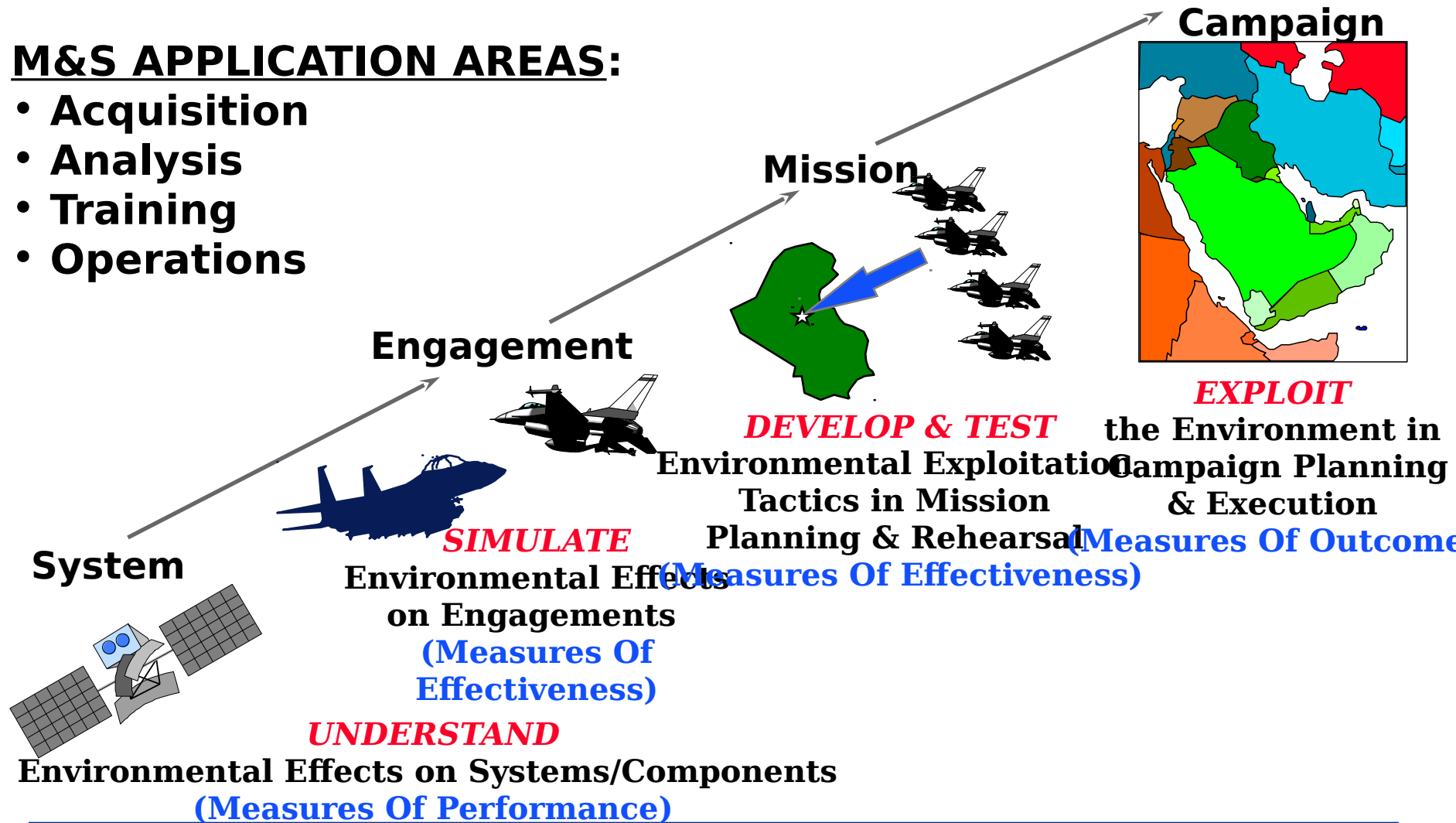


U.S. AIR FORCE

HIGH-LEVEL VIEW: THE PLAN

M&S APPLICATION AREAS:

- Acquisition
- Analysis
- Training
- Operations



As of:

Integrity - Service - Excellence



U.S. AIR FORCE

PROPOSED LONG-TERM VISION

**“Realistic, accurate weather and
weather-effects models and simulations
that capture & employ weather
exploitation
for decisive Air & Space Power”**

As of:

Integrity - Service - Excellence



U.S. AIR FORCE

THE "BIG PICTURE" Where We Are Going

- AFW provides primarily tailored services to M&S users supporting all mission areas
 - Environmental effects models, data, and tailored information
 - Environmental impacts data and tailored information
 - Decision analysis
 - Decision assistance tools and information
 - **Information** is integrated with other sources (e.g., Intel,



← **FUTURE WX SERVICES WHERE OPERATORS EMPLOY M&S**

As of:

Integrity - Service - Excellence



U.S. AIR FORCE

Current -- M&S Authority

■ USD (AT&L) Memoranda

- Air Force designated as the Modeling & Simulation Executive Agent (MSEA) for the Air & Space Natural Environment (ASNE) (9 Apr 96)**

■ ASNE MSEA Function

- Serves as the DoD Center of Excellence for M&S information, coordination, and expertise on ASNE representations**
- Focal point to interact with joint M&S programs and service components**

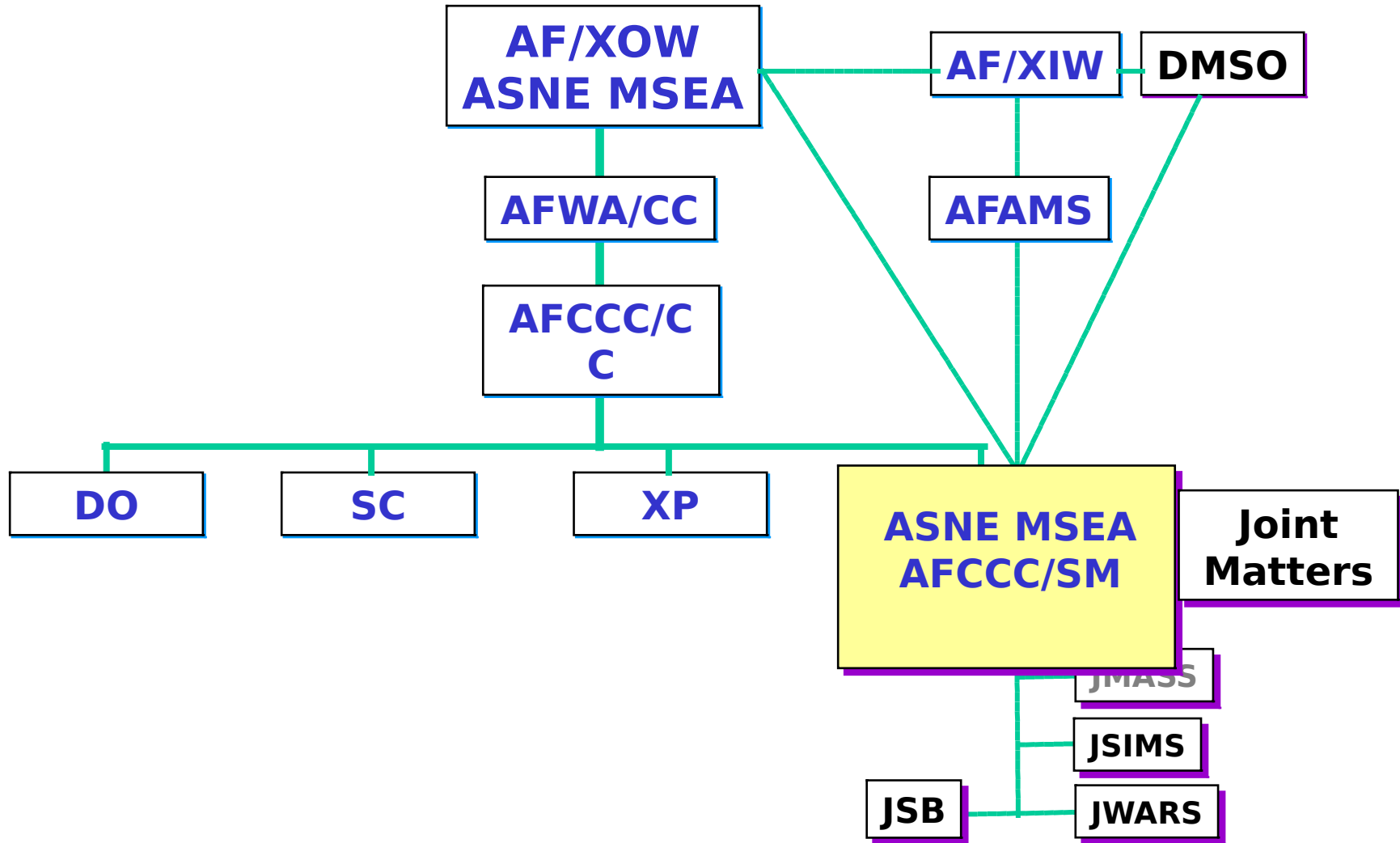
■ AF/XOW carries out ASNE MSEA duty

- XOW decision to realign ASNE MSEA office under AFCCC (6 Jan 03)**



ASNE MSEA within Air Force

U.S. AIR FORCE



Integrity - Service - Excellence



M&S Key Current Projects

U.S. AIR FORCE

- **Capabilities produced under ASNE MSEA and/or DMSO sponsorship**
 - **Advanced Climate Modeling & Environmental Simulation**
 - Reproduces 4D historical atmospheric conditions at appropriate resolution for tactical/operational/strategic analyses
 - **Environmental Scenario Generator**
 - Allows 'data mining,' production, and delivery of tailored scenarios
 - **Warfighter Weather Effects**
 - Evaluates and displays wx effects on performance of military systems
 - **Space Weather Analysis**
 - Fuels models that compute effects on GPS, HF comms, satellite drag, etc
 - **Environmental Hypercube**
 - Creates physics-based probability data to assess weapon/ sensor performance
- **Supporting major Joint simulations with liaisons and environmental scenarios**



U.S. AIR FORCE

The Way Ahead

- **Operationalize M&S Technology**
 - **Incorporate M&S into joint and warfighter arenas**
 - **Utilize M&S as planning tool**
- **Integration of Natural Environment MSEAs**
 - **Implement INEARP**
 - **Leverage ESG technology to provide one-stop source for natural environmental data**
- **Incorporate M&S into AF process**
 - **AF architecture, standards, strategic plans, capability requirements**



U.S. AIR FORCE

Conclusion

QUESTIONS?



U.S. AIR FORCE

BACK-UP SLIDES



U.S. AIR FORCE

10 “TENETS” OF AFW M&S

1. M&S is not a “customer”; it’s a tool kit that our customers will be using to accomplish their missions
 2. We must concentrate our efforts on providing *intelligent weather*; our customers can get *data* anywhere
 3. There is a distinct difference between *accuracy* and *realism*; accuracy is not always a requirement
 4. Everything that’s M&S does *not* belong to the Executive Agent
-

As of:

Integrity - Service - Excellence



U.S. AIR FORCE

10 “TENETS” OF AFW M&S

5. The transition from “Cope & Avoid” to “Anticipate & Exploit” can’t happen without a close working relationship with the Intel community
6. The transition from “Cope & Avoid” to “Anticipate & Exploit” really describes an evolution from stovepiped functions (Intel, Wx) to integrated *Information Ops*
7. In order for Simulation-based Acquisition to be fully successful, testing must include full range of realistic potential wx scenarios
8. For Distributed Mission Training to be fully

As of:

Integrity - Service - Excellence



U.S. AIR FORCE

10 “TENETS” OF AFW M&S

9. In order to emphasize weather and its effects on ops, a working relationship between Met and OR communities must be built

10. In order to identify, analyze, and predict exploitable wx regimes, emphasis must shift from “Storm of the Century” type situations to significant weather scenarios that are exploitable